UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

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MEMORANDUM

SUBJECT: Quality Assurance Project Plan for Vapor Intrusion Pathway Sampling and Analysis, Former Marley Pump Site – Reviewed

FROM: Diane Harris Diane Harris
Regional Quality Assurance Manager
ENSV/IO

TO: Michael Dandurand
EPA Project Manager
WWPD/WRAP

The review of the subject document prepared by Region 7 EPA has been completed according to *"EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations,"* EPA QA/R-5 March 2001.

Because the document was unsigned, it was reviewed as a draft and the comments are outlined below. Critical comments identify issues which need to be addressed before the document can be approved.

Critical Comments

1. When this document is ready for approval, it must be submitted with your signature and all other appropriate signatures.

2. Table 3 Sample Summary, page 12. Field duplicates do not appear in this table. §B8 states: "At least one duplicate sample will be collected for every ten samples collected. One duplicate sub-slab sample will be collected and one duplicate indoor air sample will be collected." Table 3 should include all field QC samples collected, including the field duplicates.

3. §B1 Sampling Process Design, page 8. How will the exact location of the outdoor air sample be determined?

4. Figure 2. How will it be determined if the additional location will be sampled? This additional location does not appear to be mentioned elsewhere in the QAPP.

If you have any questions, please contact the lead reviewer, Jenn Boggess at x7185, or me at x7258.

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Quality Assurance Project Plan for

Vapor Intrusion Pathway Sampling and Analysis

Former Marley Pump Site: IAD 005263785

Davenport, Iowa 52807

April 2015

Michael Dandurand, PE
Waste Remediation and Permitting Branch
Air and Waste Management Division, EPA Region 7

Date

Diane Harris
Quality Assurance Manager, EPA Region 7

Date

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A. PROJECT MANAGEMENT

A1. Distribution List

Michael Dandurand, PE, Waste Remediation and Permitting, U.S. EPA Region 7
Don Lininger, Chief, Waste Remediation and Permitting, U.S. EPA Region 7
Lorenzo Sena, Environmental Scientist, ENST, U.S. EPA Region 7

A2. Project/Task Organization

This project is being managed and administered by the Waste Remediation and Permitting Branch, Air and Waste Management Division, U.S. Environmental Protection Agency Region 7. Air monitoring issues and the indoor air sampling and analysis portion of this Quality Assurance Project Plan (QAPP) are being addressed by EPA Region 7.

EPA Region 7

Michael Dandurand, PE
AWMD/WRAP (913) 551-7504
Responsibilities: Project management and air sampling project design and implementation.

Jessica Kidwell, Geologist
ENST/EDAB (913) 551-7064
Responsibilities: Technical assistance and data review.

Lorenzo Sena, Environmental Scientist
CARB/ENST (913) 551-5094
Responsibilities: Technical assistance and implementation.

A3. Problem Definition/Background

The purpose of this QAPP is to describe the procedures to be used for environmental sampling including indoor air, sub-slab soil-gas and/or outdoor ambient air which is to take place at properties in the vicinity of the former Marley Pump site in Davenport, Iowa. This study is required based on a vapor intrusion review of the MARLEY PUMP DIRECT-PUSH INVESTIGATION REPORT REV. 00 dated June 9, 2014 prepared by the Toeroek Team. The vapor intrusion review was conducted by Jessica Kidwell, Geologist, ENST/EADB in a memorandum dated December 2014.

The Marley Pump Company – Red Jacket Division (site) is located at 500 East 59th Street is east of U.S. Highway 61 and approximately 1 mile south of Interstate 80 (I-80), on the north side of the City of Davenport, Scott County, Iowa (see **Figure 1**). The public land survey description is NE1/4, NW1/4, NW1/4 of Section 12, Township 78 North, Range 3 East. The 19.27-acre property was farmland before being acquired by Red Jacket Manufacturing Company in 1969 and developed in 1972 as part of the Brady Eighty Industrial Park (Delta Environmental Consultants, Inc. [Delta] 2004). The property is now zoned as a light industrial district and is developed with approximately 151,000 square feet of warehouse space, approximately 25,000 square feet of office space, and three large paved parking lots: the lot west of the building, the lot south of the building and across 59th Street, and the lot and loading dock area east of the building. The site manufactured and sold

a variety of water and petroleum pumps, flow optimization units, and leak detection systems. Site operations ceased in 2002. Since 2002 the site has been leased for warehousing. The site currently is owned by Murray 59th Street Property, LLC, and occupied by Murray's Warehousing and the offices of Community Action of East Iowa, Head Start, and Child Care Resource & Referral.

The Marley Pump facility is bounded north by land zoned as light industrial, east by land zoned as light industrial with planned industrial/traditional neighborhood districts beyond, south by light industrial with agricultural/light industrial/neighborhood shopping districts beyond, and west by light industrial with U.S. Highway 61 and neighborhood shopping/low density dwelling districts beyond. The facility is within the City of Davenport, Iowa, populated by 101,363 residents (U.S. Census Bureau 2014).

During the week of April 2-4, 2014, the Toeroek Team collected groundwater samples from seven DPT temporary groundwater wells (GW-1 through GW-7). The groundwater samples were collected at the down-gradient edge of the site boundary. A summary of the results is as follows:

Four constituents (1,1-dichloroethane [DCA], *cis*-1,2-dichloroethene [DCE], trichloroethene [TCE], and vinyl chloride [VC]) were detected at concentrations above their respective maximum contaminant levels (MCL) in groundwater sample GW-1. Three constituents (total arsenic, TCE, and vinyl chloride) were detected at concentrations above their respective MCLs in groundwater sample GW-2. One constituent (total and dissolved arsenic) was detected at concentrations above its MCL in groundwater samples GW-3, GW-3(FD), and GW-4. Four constituents (total arsenic, 1,1-DCA, *cis*-1,2-DCE, and TCE) were detected at concentrations above their respective MCLs in groundwater sample GW-5. One constituent (TCE) was detected at a concentration above its MCL in groundwater sample GW-6.

Indoor air sampling has not been conducted at any properties in the vicinity of the site to date. Volatile organic compounds (VOC) detected above regulatory levels included 1,1-DCA, *cis*-1,2-DCE, ethylbenzene, 1,1,2-TCA, tetrachloroethene, TCE, and vinyl chloride. Although the potential for a complete vapor intrusion pathway is low, due to the contaminant concentrations exceeding regulatory levels at the furthest down-gradient location of the site; EPA is recommending a vapor intrusion investigation to determine levels of VOCs potentially impacting indoor air at the site and at nearby buildings. EPA will use this multiple lines of evidence approach to ensure the vapor intrusion pathway is not complete.

To determine if the vapor intrusion pathway is a complete exposure pathway, a source, a migration route and a receptor must be identified. The assessment entails the identification of all known or suspected vapor sources of contamination, consideration of the contaminant migration routes and identification of those likely to be affected by the contaminants. To investigate the potential pathway field samples will be collected from indoor air and sub-slab soil-gas collected beneath building foundations. Results from the investigation will be evaluated and the conclusions will be used to support a site-wide no further action determination or recommendations for corrective action to mitigate the vapor intrusion concerns. The sampling and data assessment will be conducted following the EPA vapor intrusion and Interstate Technology and Regulation Council (ITRC) guidance. Therefore, at the request of Michael Dandurand, PE, AWMD/WRAP, EPA Region 7 the ENST Division, EPA Region 7 will provide technical Assistance to implement air monitoring for VOCs.

Analytical work will be performed by the EPA Region 7 laboratory or a laboratory designated by the regional laboratory. If the EPA Region 7 laboratory does not perform the analytical work, all referenced CARB SPBs will still apply as well as LIMS QC limits.

A4. Project Task/Description

During April of 2015 EPA personnel will install approximately 12 sub-slab sample ports in buildings on and around the site. Additional Summa canisters will be used for quality control and background purposes. The total number of Summa canisters will be approximately 22.

Sub-slab vapor grab samples will be collected by connecting a 1-liter Tedlar bag to each sampling port and drawing air into the bag using a vacuum pump. Samples will be collected and analyzed for VOCs at the EPA Region 7 laboratory or contract laboratory if deemed necessary. EPA personnel will collect indoor air samples at select locations and an ambient (background) sample.

To assess whether a vapor intrusion pathway has potential to be or is complete, a multiple lines of evidence sampling scheme will be followed consistent with ITRC guidance. Example lines of evidence include:

- Exterior soil-gas concentrations
- Sub-slab soil-gas concentrations
- Indoor air concentrations
- Ambient air concentrations
- Constituent ratios
- Internal and external sources
- Internal and external background concentrations

Environmental samples will be collected in properties near the site, specifically southeast of the site. The VOCs that will be investigated, or constituents of concern (COC), include 1,1-DCA, *cis*-1,2-DCE, ethylbenzene, 1,1,2-TCA, tetrachloroethene, TCE, and vinyl chloride.

To determine if exposure poses a potential human health risk, data will be compared to current EPA Regional Screening Levels (RSL) for Indoor Air. The COCs and indoor air risk-based concentrations for this project are listed in Table 1.

Where only sub-slab or soil-gas data are available, thee field sample data will be multiplied by the appropriate screening attenuation factor α (either site-specific or generic). Generic α are described in the ITRC guidance as sub-slab 0.1 and soil-gas 0.01. The collected data will be compared to indoor air risk-based concentrations to assess human health risk from the potentially completed vapor intrusion pathway. Note example equation below:

Sub-slab: $C_{SS} * \alpha = C_{IA}$

Where
C_{SS} = sub-slab soil-gas screening concentration ($\mu g/m^3$)
C_{IA} = indoor air concentration ($\mu g/m^3$)
α = sub-slab soil-gas attenuation factor (dimensionless)

Risk-based screening levels for carcinogens represent a $1x10^{-6}$ (one in a million) individual excess lifetime cancer risk. Non-cancer screening levels represent a hazard quotient (HQ) of 0.1 in order to account for additive health effects.

Table 1 – Risk-Based Concentrations for Indoor Air

COCs	Cancer Risk Screening Levels ($\mu g/m^3$)		Non-Cancer Hazard Screening Levels ($\mu g/m^3$)	
	10^{-6}	Source[1]	HQ = 0.1	Source[1]
1,1-DCA	1.8	EPA RSLs	N/A	EPA RSLs
cis-1,2-DCE	N/A	EPA RSLs	N/A	EPA RSLs
ethylbenzene	1.1	EPA RSLs	100	EPA RSLs
1,1,2-TCA	0.18	EPA RSLs	0.021	EPA RSLs
Tetrachloroethene	11	EPA RSLs	4.2	EPA RSLs
TCE	0.48	EPA RSLs	0.21	EPA RSLs
Vinyl Chloride	0.17	EPA RSLs	10	EPA RSLs

[1]EPA RSLs, Resident Ambient Air Table, November 2014

The data from this study will be assembled and provided to Michael Dandurand, AWMD/WRAP, EPA Region 7. Data will be assembled by the EPA Region 7 laboratory or Region 7 designated contract laboratory. If the vapor intrusion pathway is found to be complete and COCs (using multiple lines of evidence/data) are at or above risk-based screening levels, further action may be necessary. Data resulting from this sampling event will be used to complete a determination of no further action or corrective action recommendations and address comments received from the vapor intrusion review memorandum dated December 2014.

A5. Quality Objectives and Criteria for Measurement Data

By following the QAPP, Field Sampling Plan, EPA and ITRC guidance the quality objectives of this air sampling and analysis plan are to provide valid data of known and document quality such that:

- Data will be collected in a manner so that an accurate vapor intrusion pathway determination (complete or incomplete) can be made and compared to risk-based screening levels.
- Background sources of VOCs will be accounted for to minimize false positives and to further evaluate the vapor intrusion pathway.
- Data will be collected to determine the need or possible future actions.
- Indoor air samples shall be representative of the breathing zone in buildings.
- Indoor air sample data will be extrapolated to be representative of long-term exposures.
- Sub-slab samples will be used to evaluate sub-slab vapors present below buildings for comparison to screening levels.

The data quality indictors to be used are identified below. Note that field collection best practices are detailed within the guidance documents and sampling SOPs, and criteria for measurement data are embedded within the analytical methods.

- *Representativeness* will be addressed by collecting, analyzing and reporting the data as described in this document and the analytical method.
- *Comparability* will be addressed by collecting, analyzing and reporting the data as described in this document and the analytical method.
- *Completeness* is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. The completeness objective for this project will be not less than 75%.
- *VOC method accuracy* will be assessed by laboratory analysis of calibration and control standards with known concentration mixtures of multiple VOCs.
- *Method accuracy performance* will be considered acceptable if daily quality control sample results fall within the normal range of acceptable values as indicated by the LIMS QC database. This report is generated by the method and parameter specific historical quality control database maintained by the EPA Region 7 laboratory.
- *Field precision* will be assessed by collection of field duplicate samples (2 samples collected through a T connection on a single port). Field precision performance will be considered acceptable if sample results fall within +/- 50%.

A6. Special Training Requirements/Certifications

No special training or certification requirements apply to this project. Field sampling personnel have conducted numerous air sampling events using procedures and equipment required to complete this project. Field personnel should have current, appropriate health and safety training documentation.

A7. Documentation and Records

This information is covered by Region 7 ENST SOPs 2410.01 "Analytical Data Management Procedures" and 2410.10 "Analytical Data Submission Package Contents and Review." For field documentation see section B3.

B. MEASUREMENT DATA/ACQUISITION

B1. Sampling Process Design

The objective of the sampling events is to provide data to support an evaluation of the vapor intrusion pathway and the potential health risks associated with vapor intrusion for the current and potential future land uses of the properties in the vicinity of the site.

Samples will be collected from five commercial properties located near the site. Prior to sampling, the property owners/residents will be notified about the sampling event and access agreements will be obtained. Owners/Residents of the properties to be sampled will be given information regarding the air sampling event and a list of instructions. The owners/residents will be instructed to follow the set of instructions starting at least 48 hours prior to and during the sampling event. The owners/residents will also be instructed to fill out a survey that establishes an inventory of household/chemical products, such as cleaners, solvents, etc. that are present in their properties at the time of sampling.

To collect indoor air samples which will be representative of conditions related to potential chronic levels of environmental exposure in the building, multiple sample locations may be used. In addition, a chronic exposure scenario indicates that air sampling should be performed for a twenty-four hour period. Indoor air samples from the most used rooms in the building will be collected so that they are representative of conditions related to potential chronic levels of environmental exposure in the buildings. A chemical inventory will be performed in each of the buildings where samples are collected in order to identify any potential indoor air sources.

Sub-slab air, unlike indoor air, is less likely to be affected by indoor air sources (i.e., cleaners, solvents) of VOCs. In theory, it should provide information about the actual amount of VOCs migrating from the contaminated groundwater to the surface immediately below the building. While these sub-slab samples will not provide information on the actual amount of VOCs in the indoor air, they will provide information on the potential impact to indoor air from subsurface contamination.

Along with the collection of indoor air and sub-slab samples, at least one sample of upwind ambient outdoor air will be collected within the area adjacent to the properties. These samples will be used to assess the ambient outdoor air concentrations of VOCs that could impact indoor air. It is recommended to collect an ambient outdoor air sample every day indoor air samples are collected. Outdoor air samples will be collected over the same twenty-four hour period as the indoor air samples are collected. Weather conditions and wind direction will be document. (It is strongly recommended that local micro-meteorology be measured using a portable weather station in order to document local conditions instead of using regional scale airport data).

Air samples are to be collected in evacuated Summa canisters and analyzed in accordance with EPA Region 7 SOP 3230.4, "Analysis of Air Canister Samples for Volatile Organic Compounds by GC/MS." To collect representative data great care must be taken during the field sampling to ensure proper purging, leak testing and vacuum operability of the sample collection systems. Note that it is well documented in literature that vapor intrusion samples have a high degree of variability. Factors that can influence air quality in and around buildings include subsurface conditions, outdoor air concentrations and temporal variations such as temperature, wind speed/direction, barometric pressure and groundwater elevations.

The initial round of sampling is scheduled to occur in April 2015. No subsequent sampling is scheduled at this time. The sampling event will consist of collection of individual Summa canister samples from inside the buildings in the vicinity of the site. See **Figure 2** for proposed sampling locations. The outdoor air sample will be collected outside the properties at the same time the indoor air sampling is occurring. The exact location of the outdoor air sample will be determined in the field.

B2. Sampling Method Requirements

Air samples shall be collected using a pumped canister collection system or passive flow control device in accordance with EPA Region 7 SOP 2313.4, "Air Sampling with Stainless Steel Canisters." Actual air sample collection will be performed by EPA region 7 staff.

B3. Sub-Slab Port Installation

At each sub-slab sampling location, the concrete floor will be penetrated by use of a hammer drill with a 3/4-inch diameter concrete bit to a depth of about 1 inch into the slab. A 5/8-inch diameter hole will then be drilled through the center of the larger inset until the slab has been fully penetrated. An approximately 8-inch long, 0.25-inch diameter stainless steel tube will be placed through the drill hole into the sub-slab material. A Swagelok® fitting attached to the top of the probe will allow it to be opened or closed. Quick-setting grout will be used to seal the sampling probe in the drill hole. A cork surrounding the top portion of the probe will prevent grout from falling into the hole. The sub-slab sampling port will be flush with the floor and left in place until completion of the project.

After the sub-slab port is installed and the grout has hardened for at least 1 hour, a helium test will be conducted to verify that the port is properly sealed. A plastic enclosure will be placed over the port and attached Tedlar bag, a helium tank will be attached to a fitting on the enclosure by use of plastic tubing, and the tank will be opened to allow helium to flow into the enclosure. Concurrently, sub-slab vapors will be purged from the sample line and sub-slab area, requiring operation of the sampling pump at a flow rate of 5 liters per minute (L/min) until the Tedlar bag is full. The Tedlar bag will then be connected to a helium detector. If a helium reading greater than 5% above background is observed, corrective measures will be taken to address leaks in the system. If helium readings less than 5% above background cannot be achieved, the port must be abandoned and a new hole drilled. At the end of the purge time, if no helium readings greater than 5% above background have been observed, the system will be considered free of leaks and ready for sampling. The helium leak check results will be recorded in the field logbook. Port installation and leak check procedures will be in accordance with EPA Region 7 SOP 2318.07, "Vapor Intrusion Port Installation and Sampling."

B4. Sub-Slab Soil Gas Sampling

To collect a sample, about 1.5-feet of disposable, 0.25-inch diameter polyethylene tubing will be used to connect the top of the sub-slab probe to an evacuated summa canister. Before sample collection, the tubing will be connected to a small vacuum pump to purge ambient air from the tubing, probe, and immediate sub slab area.

Sub-slab vapor samples will be collected over 24-hour periods via flow regulators attached to the Summa canisters. Pertinent data, including analyses to be performed, exact sample locations, canister numbers, and start/stop times and vacuum readings will be recorded on field sheets for each sample. Sub-slab sampling will be in accordance with the procedures in EPA Region 7 SOPs 2318.07 "Vapor Intrusion Port Installation and Sampling" and 2318.10 "Shallow Soil Gas Sampling." All Summa canister samples will be analyzed for VOCs at the EPA Region 7 laboratory in accordance with EPA Region 7 SOP 3230.04 "Analysis of Ambient and Source Level Whole Air Samples for Volatile Organic Compounds by GCMS."

B5. Air Sampling

Indoor air samples will be collected at locations near the site to provide additional lines of evidence and support decisions related to a no further action determination or additional

corrective action recommendations. The indoor air samples will be collected in active business spaces. For indoor air sampling, Summa canisters will be fitted with passive flow regulating devices to enable collection of air samples for a continuous 24-hour period. All Summa canister sampling will be in accordance with EPA Region 7 SOP 4231.1704 (Environmental Response Team SOP #1704)-Summa Canister Sampling. In addition to the indoor air samples, one sample will be collected at an outside (ambient air/background) location. The ambient air sample will be collected over a 24-hour period. Pertinent data, including analyses to be performed, exact sample locations, canister numbers, and start/stop times and vacuum readings will be recorded on field sheets for each sample. All Summa canister samples will be analyzed for VOCs at the EPA Region 7 laboratory in accordance with EPA Region 7 SOP 3230.04 "Analysis of Ambient and Source Level Whole Air Samples for Volatile Organic Compounds by GCMS."

Sorbent tubes may also be used to collect indoor air if EPA so directs. These samples will be collected in accordance with EPA Method TO-17 and analyzed for VOCs at the EPA Region 7 laboratory in accordance with EPA Region 7 SOPs 3230.21 "Analysis of Air Samples for Volatile Organic Compounds using Sorbent tubes and GC/MS" or 3230.22 "Analysis of Low Level Air Samples for Volatile Organic Compounds Using Sorbent Tubes and GC/MS" as applicable. SOP 3230.21 is for analysis for VOCs at higher concentrations. For this procedure, a short sorbent tube is attached to a vacuum pump which is set to the required flow rate (e.g. 200 milliliters per minute); air is drawn into the tube for 2-8 hours. The pump is then disconnected and the sorbent tube is capped and labeled. SOP 3230.22 is used for locations where lower VOC concentrations are anticipated. It specifies use of longer sorbent tubes and samples are collected over 8-24 hours. Sorbent tubes are recommended for quarterly vapor monitoring and should be collocated with Summa canisters during the initial sampling event to enable comparison of analytical results. Flow direction arrows are marked on the sorbent tubes. It is recommended that the tubes not be placed horizontally during sampling because the sorbent material may settle, allowing preferential flow to occur along the upper edge of the tubes. (Note: sorbent tubes are not recommended for sub-slab vapor sampling because of the potential for inconsistent and unverified flow rates during the sampling period.)

B6. Sample Handling and Custody Requirements

Sample containers, preservation and holding times will be in accordance with EPA Region 7 ENST SOP 2420.06, "Sample Container Selection, Preservation and Holding Times."

Chain-of-custody procedures will be in accordance with EPA Region 7 ENST SOP 2420.04, "Field Chain of Custody for Environmental Samples."

Field documentation will be in accordance with EPA Region 7 ENST SOP 2420.05, "Identification, Documentation and Tracking of Samples."

The time of collection, location, sampling information, meteorological conditions and air sample volumes will be recorded on the field sheets produced by EPA LIMS system.

B7. Analytical Method Requirements

Canister samples will be analyzed in accordance with EPA Region 7 analytical method SOP 3230.4, "Analysis of Air Canister Samples for Volatile Organic Compounds by GC/MS."

Note that the reporting limits for the routine TO-15 Scan EPA Region 7 analytical method SOP 3230.4 are greater than 10^{-6} cancer risk level as described in Table 2. Therefore, low detection limits have been requested for samples expected to contain low concentrations of the listed compounds. If the reporting value is above the 10^{-6} risk level, then results will be compared to the 10^{-5} and 10^{-4} excess individual lifetime cancer risk values. Table 3 includes a sample summary that describes each location, sample type, and analysis requested. Table 4 includes a data quality objectives summary.

Table 2 – Method 3230.4 Reporting and Detection Limits

COC	Reporting Limit ($\mu g/m^3$)	Method Detection Limit ($\mu g/m^3$)
1,1-DCA	0.835	0.14
cis-1,2-DCE	0.841	0.15
Ethylbenzene	0.93	0.22
1,1,2-TCA	1.158	0.41
Tetrachloroethene	1.439	0.35
TCE	1.139	0.36
Vinyl Chloride	0.548	0.07

Table 3 – Sampling Summary

Quality Assurance Project Plan for Vapor Intrusion Pathway Sampling and Analysis Former Marley Pump Site: IAD 005263785 Davenport, Iowa 52807 April 2015							
EPA Project Manager: Mike Dandurand				**Activity/ASR #:** TBD			
No. of Samples	**Matrix**	**Location**	**Purpose**	**Depth or other Descriptor**	**Requested Analysis**	**Sampling Methodology**	**Analytical Method/SOP**
8/9	Indoor Air	Businesses Southeast of the Site	To assess whether airborne site-related compounds are present inside the buildings	N/A	VOCs	EPA SOPs 2313.04 & 4231.1704	EPA SOP 3230.04
8/9	Sub-Slab Soil Gas	Businesses Southeast of the Site	To assess whether site-related compounds are present below the buildings	Directly Below Slab	VOCs	EPA SOPs 2318.07 & 2318.10	EPA SOP 3230.04
Background Sample							
1	Ambient Air	Outside near the site	To assess ambient air quality	N/A	VOCs	EPA SOPs 2313.04 & 4231.1704	EPA SOP 3230.04
QC Samples							
1	Air (Summa Canister)	Trip Blank	To assess field/transportation related contamination	N/A	VOCs	N/A	EPA SOP 3230.04

Table 4 – Data Quality Objectives

Quality Assurance Project Plan for Vapor Intrusion Pathway Sampling and Analysis Former Marley Pump Site: IAD 005263785 Davenport, Iowa 52807 April 2015								
EPA Project Manager: Mike Dandurand						**Activity/ASR #:** TBD		
Analysis	**Analytical Method**	**Data Quality Measurements**					**Sample Handling Procedures**	**Data Management Procedures**
		Accuracy	**Precision**	**Representativeness**	**Completeness**	**Comparability**		
INDOOR AIR, AMBIENT AIR, AND SUB-SLAB SOIL GAS								
VOCs	See Table 3	Per Analytical Method	Per Analytical Method	Judgmental sampling, based on professional judgment of the sampling team	100%; no critical samples have been identified	Standardized procedures for sample collection and analysis will be used	See Section B6 of QAPP	See Section B13 of QAPP

B8. Quality Control Requirements

Duplicates and a trip blank will be collected during each sampling event. At least one duplicate sample will be collected for every ten samples collected. One duplicate sub-slab sample will be collected and one duplicate indoor air sample will be collected. Duplicates will be used to assess field precision.

A trip blank is a canister that is unopened during the entire sampling even. It is recommended to have one trip blank for every field deployment, and if there is more than one canister supplier, analyze one trip blank from each canister supplier. Trip blank samples will be used to evaluate whether field samples may have been cross –contaminated during shipping or handling. Detections in laboratory blank samples will be used to qualify similar detections in associated field samples. Ambient background outdoor air samples will be used to assess the completeness of the vapor intrusion pathway, not to qualify other sample data.

Laboratory quality control elements including spikes and blanks will be performed in accordance with the above referenced analytical SOPs and EPA Region 7 ENST SOP 2430.12, "Regional Laboratory Quality Control Policy."

B9. Instrument/Equipment

The field equipment and analytical instrument testing, inspection and maintenance will be performed in accordance with the above referenced analytical and sample collection SOPs along with manufacturers' recommendations.

B10. Instrument Calibration and Frequency

The field equipment and analytical instrument calibration will be performed in accordance with the appropriate referenced analytical or sample collection SOPs along with manufacturers' recommendations.

B11. Inspection/Acceptance Requirements for Supplies and Consumables

No special requirements are needed. (Note Summa canister inspection/acceptance requirements are detailed in SOP 3213.4, "Air Sampling with Stainless Steel Canisters.")

B12. Data Acquisition Requirements

Data collected from previous projects will have been collected under approved QAPPs, and will be of known and documented quality.

B13. Data Management

Analytical data management will be in accordance with EPA Region 7 ENST SOP 2410.01, "Analytical Data Management Procedures", and applicable program specific SOPs.

C. ASSESSMENT/OVERSIGHT

C1. Assessments and Response Actions

The EPA QA manager or their designee may conduct an audit of the field activities for this project if requested by the EPA project manager. The EPA QA manager will have the authority to issue a stop work order upon finding a significant condition that would adversely affect the quality and usability of the data. The EPA project manager will have the responsibility for initiating and implementing response actions associated with findings identified during the on-site audit. Once the response actions have been implemented, the EPA QA manager will perform a follow-up audit to verify and document the response actions were implemented effectively.

C2. Reports and Management

A final report will not be prepared for these sampling events. The Project Manager and internal technical support staff will review and evaluate the analytical results against the DQOs. The end product for the vapor intrusion evaluation is to provide supportive information to make a site-wide no further action determination or recommendations for corrective action as necessary.

D. DATA VALIDATION AND USABILITY

D1. Data Review, Validation and Verification Requirements

The data will be peer reviewed by a qualified analyst and the laboratory section manager identified in Region 7 ENST SOPs 2410.10, "Analytical Data Submission Package Contents and Review," and 2430.12, "Regional Laboratory Quality Control Policy." The EPA Project Manager will be responsible for overall validation and final approval of the data in accordance with project purpose and use of the data.

D2. Validation and Verification Methods

The data will be validated in accordance with Region 7 ENST SOPs 2430.12, "Regional Laboratory Quality Control Policy" and 2410.10, "Analytical Data Submission Package Contents and Review." QC spot checks will be performed by the Region 7 laboratory following frequency and criteria outlined in Region 7 ENST SOP2430.05, "Quality Control Spot Checks of Regional Laboratory Data Packages."

The EPA Project Manager will perform the final review and approval of the data prior to it being entered into the LIMS system as valid. The EPA Project Manager will look at field duplicates and trip blanks to ensure they are acceptable. The Region 7 laboratory or designated laboratory will report the actual results for MS/MSD and lab blanks to the project manager upon request. The EPA Project Manager will also compare the sample descriptions with the field sheets for consistency and will ensure that any anomalies in the data are appropriately documented.

D3. Reconciliation and User Requirements

Once the data results are compiled, the EPA RPM will review the field duplicates to determine if they fall within the acceptance limits as defined in this QAPP. Completeness will also be evaluated to determine if the completeness goal for this project has been met. If data quality indicators do not meet the project's requirements as outlined in this QAPP (including the accuracy for lab spikes), the data may be discarded and re-sampling may occur. The EPA project manager will evaluate the cause of the failure (if possible) and make the decision to discard the data and re-sample. If the failure is tied to analysis; calibration and maintenance techniques will be reassessed as identified by the appropriate lab personnel. If the failure is associated with the sample collection and re-sampling is necessary, the sampling personnel may be executed.

E. REFERENCES

1. ITRC (Interstate Technology and Regulation Council), "Vapor Intrusion Pathway: A Practical Guideline," (2007)

2. EPA Regional Screening Table. Available on-line at: http://www.epa.gov/region9/superfund/prg (January 2015)

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FIGURE 1

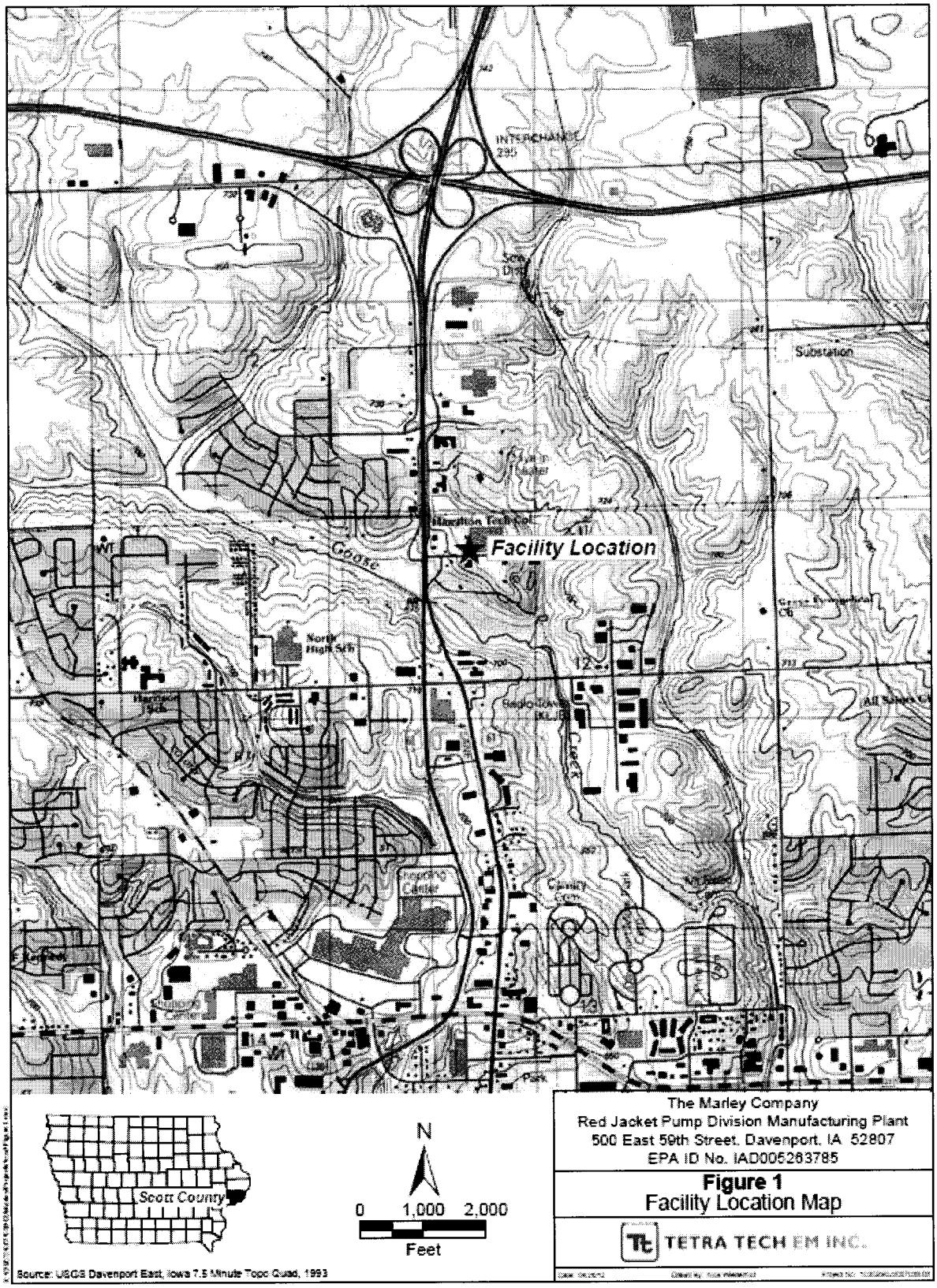
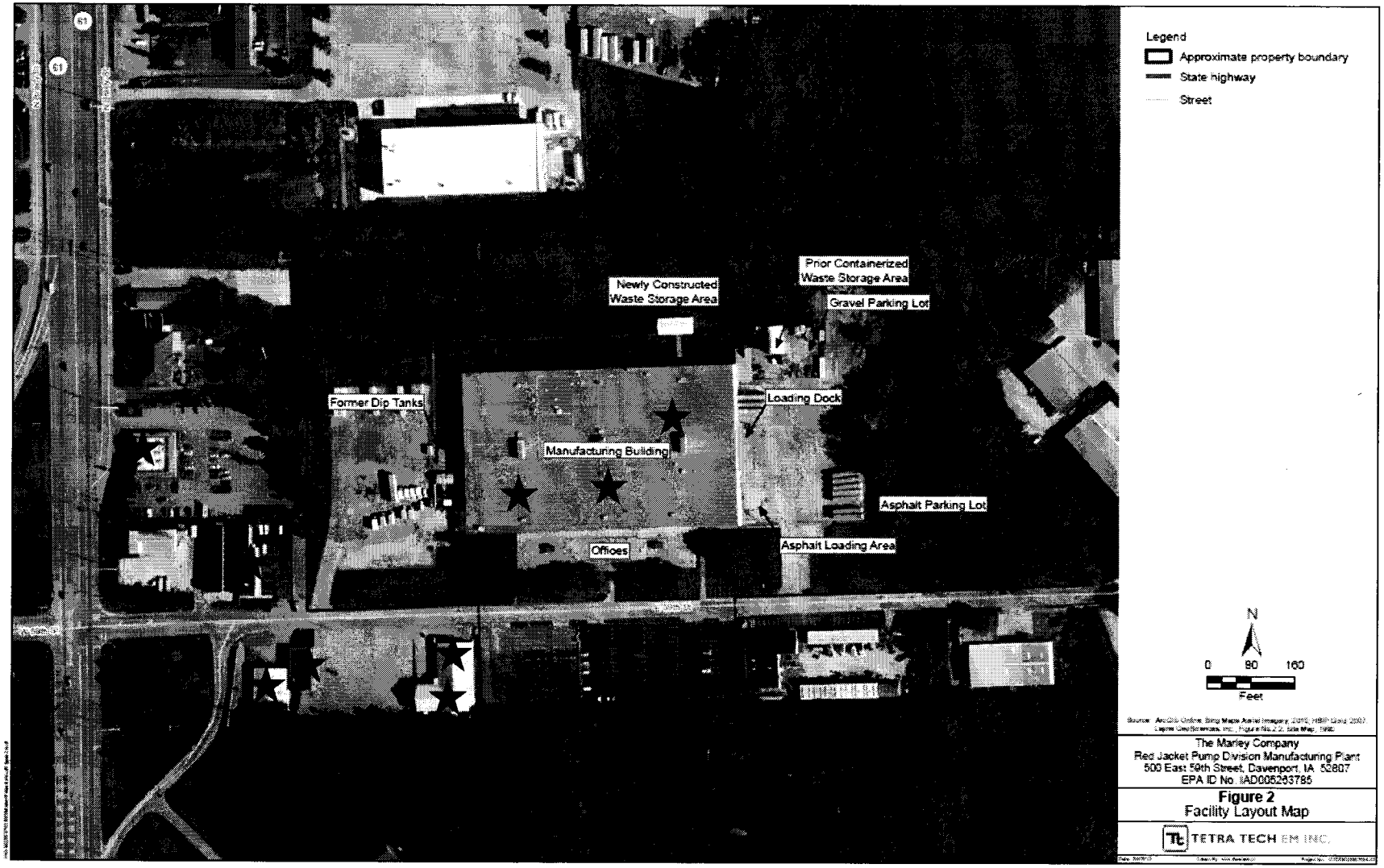

Facility Location
Scott County
N
0 1,000 2,000
Feet
Source: USGS Davenport East, Iowa 7.5 Minute Topo Quad, 1993
The Marley Company
Red Jacket Pump Division Manufacturing Plant
500 East 59th Street, Davenport, IA 52807
EPA ID No. IAD005263785
Figure 1
Facility Location Map
TETRA TECH EM INC.

FIGURE 2



Sampling locations are indicated by a ★ on the map. ★ Indicates potential additional location.